# Strategic Planning to Achieve Holistic Integrated Emission Minimization: Some Facility-Specific Considerations

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What criteria do facilities managers use to develop a long-term strategy to assure environmental compliance?

How and why does performance sometimes exceed minimum regulatory requirements?

***Factors in Facility managers' perceptions of appropriate solutions to issue:***

-Awareness of “Industrial Ecology”.

-Assumed value *vs.* “cost” of alternatives.

-Perceived consequences of noncompliance.

-Health & Eco Risk reduction potential.

-Project team information available.

-Organizational cultural expectations.

-Regulatory compliance requirements.

Incentivization drivers available.

Command & control vs. free market opportunities.

# CONSTRAINTS ANALYSIS ASSUMPTIONS

Self-Managed SIP/TIP.
Emission inventory based associated offset credits
purchase may be necessary.
Facility growth potential: NOx cap for “synthetic minor”
avoid “major source” designation.
Multiple fuels are necessary for available power.
Sustainable distributed energy sources are preferred.
Emergency backup power can be “cost oblivious”.
Competitive state / federal external funding is available
to develop many sustainable projects.
Multi-disciplinary teams work well on high-tech tasks.

## *Example #1 Operate, evaluate, demonstrate various stationary fuel cell power plants.*

-Educate potential users in rapidly evolving field.

-Generate clean, highly available, “computer-quality”, distributed electrical power with natural gas/$H_2$.

-Co-generate reliable distributed heat for both boiler condensate return and domestic hot water.

-Collaborate with manufacturers.

-Generate and sell renewable energy credits “RECs’.

-Obtain Connecticut Clean Energy Fund program support.

-Facility credibility / outside support from: public relations, environmental advocacy, engineering, tribal, regulatory groups.

-Reduce additional needed growth-associated additional boiler capacity and associated maintenance cost.

# EXAMPLE: #2 Mobile source applications of fuel cells.

-Generate / store hydrogen from solar electrolysis
use with reversible fuel cell.
-Construct / operate / demonstrate reversible
stationary backup fuel cell or H2-powered fuel
cell powered vehicle.
-Indoor motor vehicle use.
-Hythane.

# EXAMPLE: #3 Alternate fuel use.

-Provide partial financial support to regional school bus demonstration of ULS fuel.
-Generate and use hydrogen fuel in vehicles /fuel cells.
-Generate solar hydrogen.
-Use indoor fuel cell-powered vehicles.
-Use electric fuel cells.
-Demonstrate electric powered vehicles.

## *EXAMPLE: #4 Comparative performance of gasoline-electric hybrid vehicles for security force.*

-Assess performance:

Duty cycle idling, below 35 mph electric, live parking.

Comparative maintenance.

Inclement weather performance.

Emissions.

Fuel use.

# EXAMPLE 5: Alternate security vehicles.

Hybrid security vehicles

Emission reduction.

Fuel savings.

Vehicle reliability.

Public Education: presence and awareness of technology.

Offset value.

Consequences of quiet operation.

Bicycle use:

Emissions.

Quiet and stealth.

Cost.

Employee effectiveness.

# *Example # 6 Air emission credit trading.*

-Sell facility's sustainably-generated Renewable Energy Credits ("RECs").

-Purchase stationary source certified Emission Reduction Credits ("ERCs") to offset facility–associated modeled mobile source ozone precursors.

-Plant new certified rainforest to sequester and offset fuel cell associated carbon emissions.

## *Example 8: Daycare heating and cooling by ground source heat pumps.*

-Low air pollution source.
-Daylight hours of daycare operation.
-Groundwater pumped and re-injected.
-Potential for linkage with solar and fuel cells.

## EXAMPLE #9 Materials:
## Conservation, Recycling and Reuse.

-Food waste used on hog farm, composted, sold.
-Cardboard, bottles, glass, plastic, metal, cooking grease sold.
-Low VOC paint, material substitutes.
-Vehicle maintenance shop: solvents, metals, batteries, fluids, tires.